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10/733,233	12/12/2003	Yoshihiro Miyagawa	67161-132	9458

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EXAMINER

GRAYBILL, DAVID E

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 09/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/733,233	Applicant(s) MIYAGAWA, YOSHIHIRO	
	Examiner David E. Graybill	Art Unit 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2006.
 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-10 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) ☐ Claim(s) _____ is/are allowed.
 6) ☒ Claim(s) 1-6 and 8-10 is/are rejected.
 7) ☐ Claim(s) _____ is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☒ The drawing(s) filed on 12 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6-16-6 has been entered.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. See MPEP 608.02(d); 37 CFR 1.81(b); *Bocciarelli v. Huffman*, 109 USPQ 385 (CCPA 1956); *WARNER JEWELRY CASE COMPANY v. WOLFSHEIM & SACHS, INC.*, 68 USPQ 267 (DC WNY 1946); *Ex parte HELMERSON*, 130 USPQ 244 (PTO 1961); *In re Complete Application-Drawing Required*, 152 USPQ 290 (ComrPats 1966); and *Marks v. Hodgins*, 99 USPQ 23 (BdPatApp&Int 1953).

Therefore, the following features must be shown or the features canceled from the claims:

All the features of claims 2, 5, 8 and 10.

Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or

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figure number of an amended drawing should not be labeled as "amended."

If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –
(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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Claims 1 and 3 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Seo (6376308).

At column 4, lines 4-38; column 5, lines 22-30 and 38-49; column 6, lines 47-49; column 6, line 66 to column 8, line 7; column 8, lines 22-29 and 42-58; column 9, lines 8-11; and column 13, lines 1-31, Seo discloses a method of manufacturing a semiconductor device in which a plurality of combinations of a gate electrode 95 and a gate insulating film 90 are formed so as to extend in parallel on a semiconductor substrate, comprising the steps of: forming a first insulating film 110a along the surfaces of a plurality of the gate electrodes and the surfaces of said semiconductor substrate between the adjacent gate electrodes, respectively; forming a second insulating film 110b different from said first insulating film on said first insulating film; and forming a third insulating film 110a same as said first insulating film and different from said second insulating film on said second insulating film; and forming a fourth insulating film 110b same as said second insulating film and different from said first insulating film on said third insulating film; wherein said first insulating film is composed of USG, and said second insulating film is composed of one substance selected from a group consisting of BPSG, PSG, BSG, and USG.

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The following is a quotation of 35 U.S.C. 103 (a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4 and 6 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Seo (6376303).

Seo is applied as it is applied to claim 1 supra.

However, Seo does not appear to explicitly disclose wherein said first insulating film has a film thickness of 3 to 5 % of a distance between the gate electrodes of adjacent two of said combinations; wherein said second insulating film has a film thickness of 5 to 10 % of the distance between the gate electrodes of adjacent two of said combinations.

Nonetheless, as cited, Seo discloses that insulating film thickness is a result effective variable. Moreover, as reasoned from well established legal precedent, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular claimed film thickness limitations because applicant has not disclosed that, in view of the applied prior art, the limitations are for a particular unobvious purpose,

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produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another thickness. Indeed, it has been held that optimization of range limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See MPEP 2144.05(II): "Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. '[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.'" In re Aller, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955). See also In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969), Merck & Co. Inc. v. Biocraft Laboratories Inc., 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989), and In re Kulling, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990). As set forth in MPEP 2144.05(III), "Applicant can rebut a prima facie case of obviousness based on overlapping ranges by showing the criticality of the claimed range. 'The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must

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show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range.’ In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). See MPEP § 716.02 - § 716.02(g) for a discussion of criticality and unexpected results.” In addition, as also reasoned from well established legal precedent, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that, in view of the applied prior art, the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

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Claims 2 and 5 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Seo as applied to claim 1 supra, and further in combination with Frankel (20020073922) and Jang (6239002).

As cited, Seo discloses wherein said first insulating film is formed under a condition that a temperature for film-forming is set to 450 to 550°C "about 400-600° C," a pressure "low pressure" for film-forming is set; wherein the step of forming said second insulating film is performed under a condition that a temperature for film-forming is set to 450 to 550°C "about 400-600° C," a pressure "low pressure" for film-forming is set, and a total concentration of an impurity composed of at least one of P and B is set to at most 15wt% "6-8 weight % and 4-5 weight %."

However, Seo does not appear to explicitly disclose wherein said first insulating film is formed under a condition that a concentration of O₃ is set to 0 to 3.0wt%, a molar ratio of O₃/TEOS is set to at most 3.0, and an inert gas is used as a carrier gas; wherein the step of forming said second insulating film is performed under a condition that a concentration of O₃ is set to 8.0 to 17.0wt%, a molar ratio of O₃/TEOS is set to 3.0 to 15.0, and an inert gas is used as a carrier gas.

Regardless, at paragraphs 3, 18, 75, 79, 85, 201-234, 286-290, 292, 298-307 and 312-315, Frankel discloses wherein said first insulating film is

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formed under a condition that a concentration of O_3 is set, a ratio of O_3 /TEOS is set to at most 3.0 "between about 2-6:1," and an inert gas is used as a carrier gas; wherein the step of forming said second insulating film is performed under a condition that a concentration of O_3 is set to 8.0 to 17.0wt% "between about 5-16 weight percentage," and an inert gas is used as a carrier gas. In addition, it would have been obvious to combine this disclosure of Frankel with the disclosure of Seo because it would facilitate provision of the first and second insulating layers of Seo.

However, Seo and Frankel do not appear to explicitly disclose wherein said first insulating film is formed under a condition that a concentration of O_3 is set to 0 to 3.0wt%.

Nevertheless, as cited, the applied prior art discloses that O_3 concentration is a result-effective variable. Moreover, as reasoned from well established legal precedent, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular claimed O_3 concentration because applicant has not disclosed that, in view of the applied prior art, the concentration is for a particular unobvious purpose, produces an unexpected result, or is otherwise critical, and it appears prima facie that the process would possess utility using another concentration.

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Indeed, it has been held that optimization of range limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See MPEP 2144.05(II): "Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. '[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.'" In re Aller, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955). See also In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969), Merck & Co. Inc. v. Biocraft Laboratories Inc., 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989), and In re Kulling, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990). As set forth in MPEP 2144.05(III), "Applicant can rebut a prima facie case of obviousness based on overlapping ranges by showing the criticality of the claimed range. 'The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range.' In

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re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). See MPEP § 716.02 - § 716.02(g) for a discussion of criticality and unexpected results.”

Also, Seo and Frankel do not appear to explicitly disclose that the O₃/TEOS ratio is a molar ratio.

Nonetheless, at column 7, lines 42-43, Jang discloses that an O₃/TEOS ratio is a molar ratio. Furthermore, it would have been obvious to combine this disclosure of Jang with the disclosure of the applied prior art because it would facilitate provision of the O₃/TEOS ratio of the applied prior art.

In addition, Seo, Frankel and Jang do not appear to explicitly disclose that the step of forming said second insulating film is performed under a condition that the molar ratio of O₃/TEOS is set to 3.0 to 15.0.

Still, as cited, the applied prior art discloses that the molar ratio of O₃/TEOS is a result-effective variable. Moreover, as reasoned from well established legal precedent, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular claimed the molar ratio of O₃/TEOS because applicant has not disclosed that, in view of the applied prior art, the ratio is for a particular unobvious purpose, produces an unexpected result, or is otherwise critical, and it appears prima facie that the process would possess utility using another ratio.

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Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seo as applied to claim 1 supra, and further in combination with Frankel (20020073922).

As cited, Seo discloses wherein said second insulating film is deposited using a reaction gas consisting of a plurality of kinds of gases "boron and phosphorous" which flows into a chamber.

However, Seo does not appear to explicitly disclose that after the step of depositing said second insulating film, a supply into said chamber of at least one of said plurality of kinds of gases is stopped, and a gas which is different from said reaction gas and does not cause a reaction for deposition of said second insulating film flows into said chamber so that a pressure in said chamber is maintained constant.

Nonetheless, as cited, Seo discloses that the second film is PSG or BPSG and the third film is USG "alternating layers of BPSG and USG, or alternating layers of PSG and USG," and depositing the second film and the third film in the same chamber. In addition, as cited, Frankel discloses wherein an insulating PSG or BPSG film is deposited using a reaction gas consisting of a plurality of kinds of gases "TEB" and "TEPO" which flows into a chamber 15, and after the step of depositing the insulating film, a supply into the chamber of at least one of the plurality of kinds of gases is stopped

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"Flow of the dopant source into chamber 15 then is stopped." Moreover, it would have been obvious to combine this disclosure of Frankel with the disclosure of Seo because it would facilitate provision of the second and third film of Seo.

Also, Seo does not appear to explicitly disclose that a gas which is different from the reaction gas and does not cause a reaction for deposition of the second insulating film flows into the chamber so that a pressure in the chamber is maintained constant.

Notwithstanding, as cited, Seo discloses that the third film is USG and the fourth film is PSG or BPSG, "alternating layers of BPSG and USG, or alternating layers of PSG and USG," and depositing the third film and the fourth film in the same chamber. Also, as cited, Frankel discloses that a gas "inert gas" which is different from the reaction gas and does not cause a reaction for deposition of the second insulating film flows into the chamber so that a pressure in the chamber is maintained constant "flowing the inert gas into chamber 15 for an amount of time necessary to stabilize the pressure." Furthermore, it would have been obvious to combine this disclosure of Frankel with the disclosure of Seo because it would facilitate provision of the fourth film of Seo.

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Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seo as applied to claim 1, and further in combination with Frankel (20020073922) and Lin (6333277).

Frankel is applied for the same reasons it is applied to claim 8.

However, Seo and Frankel do not appear to explicitly disclose at least one of said plurality of kinds of gases flows through a vent line to the outside of said chamber.

Still, at column 4, line 50 to column 5, line 51, Lin discloses at least one of a plurality of kinds of gases "gaseous reactant" flows through a vent line "bypass pipeline" to the outside of a "chamber." Moreover, it would have been obvious to combine this disclosure of Lin with the disclosure of Seo and Frankel because it would facilitate provision of the fourth film of the applied prior art.

Applicant's remarks filed 6-16-6 have been fully considered and are adequately treated supra.

The art made of record and not applied to the rejection is considered pertinent to applicant's disclosure. It is cited primarily to show inventions relevant to the examination of the instant invention.

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The art made of record and not applied to the rejection is considered pertinent to applicant's disclosure. It is cited primarily to show inventions relevant to the examination of the instant invention.

For information on the status of this application applicant should check PAIR:


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Alternatively, applicant may contact the File Information Unit at (703) 308-2733. Telephone status inquiries should not be directed to the examiner. See MPEP 1730VIC, MPEP 203.08 and MPEP 102.

Any other telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (571) 272-1930. Regular office hours:

Monday through Friday, 8:30 a.m. to 6:00 p.m.

The fax phone number for group 2800 is (571) 273-8300.



David E. Graybill
Primary Examiner
Art Unit 2822

D.G.

31-Aug-06